Infection Prevention, Outbreaks, and the Role of Public Health

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SHARPPS Program
North Carolina Division of Public Health
Spring 2025

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Objectives

- Describe legal framework for disease surveillance, investigation, and response
- Review outbreak surveillance data and trends over time
- Discuss when to call Public Health
- Discuss role of Public Health in infection prevention and outbreak response
- Describe an outbreak response in a long-term care setting

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Legal Framework

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Public Health: Legal Framework

Public Health Laws and Rules:

- General Statutes
- NC Administrative Code rules

Health Director's Authority (State & Local)

- Surveillance
- Investigation
- Control Measures

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Public Health Law

General Statutes §130A-144: Investigation and Control Measures

(a) The **local health director shall investigate**… cases of communicable diseases and communicable conditions reported to the local health director

(b) Physicians, persons in charge of medical facilities or laboratories, and other persons shall… **permit a local health director or the State Health Director to examine, review, and obtain a copy of medical or other records…**

(d) The **attending physician shall give control measures**… to a patient with a communicable disease or communicable condition and to patients reasonably suspected of being infected or exposed to such a disease or condition.

(e) The **local health director shall ensure that control measures**… have been given to **prevent the spread** of all **reportable communicable diseases** or **communicable conditions** and **any other communicable disease or communicable condition that represents a significant threat to the public health.**

(f) All **persons shall comply with control measures**, including submission to examinations and tests…

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Public Health Law

10A NCAC 41A .0103: Duties of local health director: report communicable diseases

(a) Upon receipt of a report of a communicable disease or condition… the **local health director** shall:

(1) immediately **investigate** the circumstances… [to] include the collection and submission for laboratory examination of specimens necessary to assist in the diagnosis and indicate the duration of control measures;

(2) determine what **control measures** have been given and ensure that proper control measures… have been given and are being complied with;

(c) Whenever an **outbreak of a disease or condition** occurs which is not required to be reported… but **which represents a significant threat to the public health**, the local health director shall give appropriate control measures… and **inform the Division of Public Health**

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Public Health Law

10A NCAC 41A .0101: **Reportable diseases and conditions**

- **80+ reportable diseases and conditions**
  - Timeline of reporting varies between immediately and within 7 days
- **Laboratory** reporting requirements

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Public Health Law

- **10A NCAC 41A .0106**
  - Infection Prevention – Reporting of Healthcare Associated Infections
- **10A NCAC 41A .0201**
  - General Control Measures
- **10A NCAC 41A .0206**
  - Infection Prevention – Health Care Settings; 1992
- **10A NCAC 41A .0202 - .0205**
  - Control Measures for HIV, Hepatitis B, STDs, TB

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Role of Public Health

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NC Division of Public Health

Mission

North Carolina Public Health works to promote and contribute to the highest possible level of health for the people of North Carolina.

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NC SHARPPS Program

SHARPPS= Surveillance for Healthcare-Associated Infections and Resistant Pathogens Patient Safety

Mission

To work in partnerships to prevent, detect, and respond to events and outbreaks of healthcare-associated and antimicrobial resistant infections in North Carolina.

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SHARPPS Program Activities

Surveillance, Investigation & Response	Prevention, Education & Training	Monitoring & Evaluation	Communication
HAI reporting to NHSN MDRO surveillance DHSR Infection Prevention Breach reporting Outbreak & Exposure management	Antimicrobial resistance & stewardship Infection Control, Assessment & Response (ICAR) Drug Diversion Partnerships	Data validation TAP reports Identification, evaluation of aberrant data (CLABSI, CDI)	HAI data reports Newsletters Webinar updates Social Media Tabletop Exercises Partnerships

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When Should Public Health Be Called?

- Reportable diseases / conditions (10A NCAC 41A .0101)
  - https://epi.dph.ncdhhs.gov/cd/report.html (Form 2124)
- When **any** disease is above normal baseline (i.e., an "outbreak")
- Report suspected infection prevention breach

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Who Should Be Called?

- Your supervisor/manager
- Local health department
- North Carolina Division of Public Health 24/7 epidemiologist on call: 919-733-3419
  - SHARPPS Program: nchai@dhhs.nc.gov
  - Infection Prevention Program: infectionprevention@dhhs.nc.gov
- North Carolina Statewide Program for Infection Control and Epidemiology (NC SPICE): spice@unc.edu, 919-966-3242
- Local hospital infection preventionist

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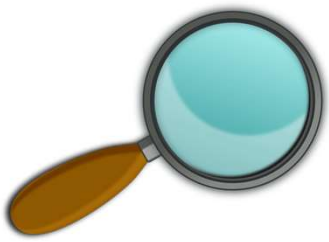
What Happens After Public Health Is Called?

- Data review
- Clinical investigation
- Environmental investigation
- Control measures
- Communication
  - Resident/staff/family/public
- Laboratory Support



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When Is It An Outbreak?

- Anything above what is normally seen for any given time period
- If you aren't sure, call Public Health!
- In a facility setting, an outbreak is generally defined as **two or more** individuals with the same illness
  - **Caveat to this rule:**
    - One case of certain diseases = Outbreak
    - Disease not normally seen (Avian Flu, MERS, Ebola)

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Outbreak Assistance

We can assist with:

- Determining if it is an outbreak
- Guidance, tools and onsite support
- Facilitating and coordinate calls with partners
- Written recommendations

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Examples of Responses

- Multidrug Resistant Acinetobacter (CRAB) in a nursing home
- Acute Hepatitis B among shared glucometer patients
- Potential C. auris transmission in dialysis facility
- Post-op endocarditis among patients receiving same surgical device
- Legionellosis associated with healthcare facilities
- National responses:
  - Non-tuberculosis mycobacterium (NTM) and heater-cooler units
  - Resistant Pseudomonas and artificial tears
  - Botulism-like illness following cosmetic surgery

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Outbreak Summary

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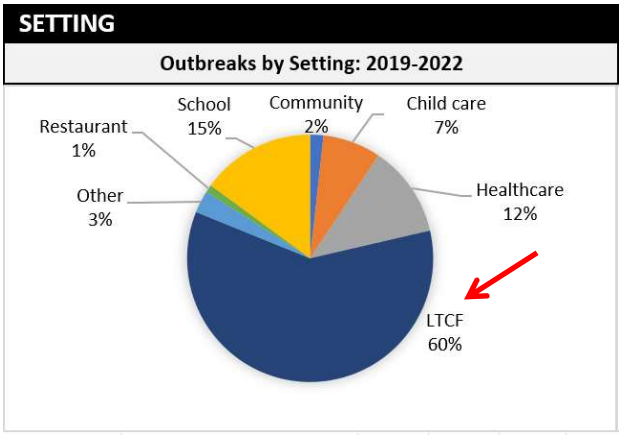
2019-2022 Outbreak Summary



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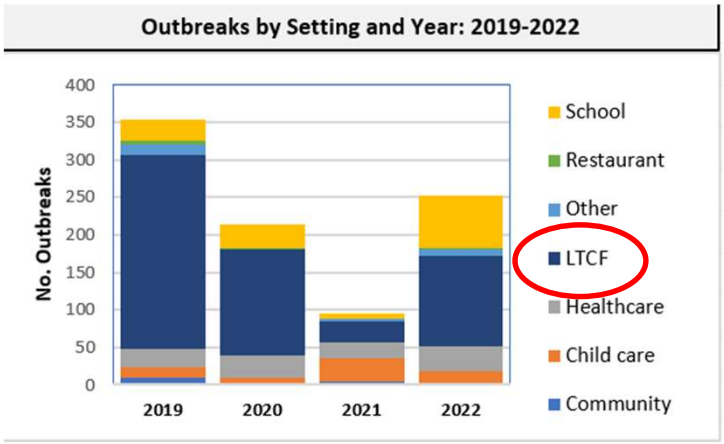
2019-2022 Outbreak Summary



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Safe Injection Practices

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Safe Injection Practices

- Measures taken to perform injections in a safe manner for patients and providers
- Prevent transmission of infectious diseases from
  - Patient to provider
  - Provider to patient
  - Patient to patient
- Pathogens
  - Bloodborne – Hepatitis B (HBV), Hepatitis C (HCV), Human Immunodeficiency Virus (HIV)
  - Bacterial, fungal

http://www.cdc.gov/injectionsafety/

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Tuesday, October 12

- County health department notified by infection preventionist at local hospital
- 4 cases of acute Hepatitis B
- Residents of the same assisted living facility

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Investigation Methods

- Evaluated infection control practices
  - Observations
  - Interviews
- Searched for additional cases
  - Serologic testing of all residents
  - Hospital records, surveillance databases
- Epidemiologic study
  - Potential healthcare exposures, risk factors

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HBV Outbreak in Assisted Living Facility

Cases identified	**8**
Mean age	**70.6 years**
Hospitalized	**8 (100%)**
Died	**6 (75%)**

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Health Care Exposures

Exposure	Attack rate (%) Exposed	Not exposed
Assisted BGM	**8/15 (53)**	**0/25 (0)**
Injected medication	**4/16 (25)**	**4/22 (18)**
Phlebotomy	**4/25 (16)**	**4/15 (27)**
Blood transfusion	**0/1 (0)**	**8/38 (21)**
Catheter device	**0/3 (0)**	**8/37 (22)**
Wound care	**1/8 (13)**	**6/28 (21)**

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Infection Control Observations

- Glucose meters
  - Used for more than one resident
  - Not disinfected between uses
- Adjustable lancing devices
  - Used for more than one resident

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Recommendations to Facility

- Use single-use disposable lancets
- Purchase and use individual glucose meters for each resident
- Vaccinate all susceptible residents

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Direct Communication to Providers

- Sent to all licensed facilities and providers statewide

North Carolina Department of Health and Human Services
Division of Public Health • Epidemiology Section
Section Office
1902 Mail Service Center • Raleigh, North Carolina 27699-1902
Tel 919-733-3421 • Fax 919-733-0195

Beverly Eaves Perdue, Governor
Lanier M. Cansler, Secretary

Jeffrey P. Engel, MD
State Health Director

December 2, 2010

TO: All North Carolina Health Care Providers

FROM: Megan Davies, MD, State Epidemiologist

WARNING: SPREAD OF HEPATITIS B THROUGH UNSAFE DIABETES CARE

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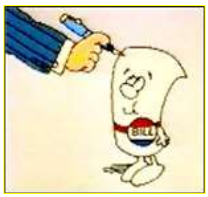
"Act to Protect Adult Care Home Residents"



- Signed into law May 31st, 2011
- Requires
  - Stronger infection prevention policies
  - Inspection and monitoring of infection prevention activities
  - Reporting of suspected outbreaks
  - Increased training and competency evaluation for medication aides, adult care home supervisors

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CMS Required Reporting

Center for Clinical Standards and Quality/Survey & Certification Group

Ref: S&C: 14-36-All

DATE: **May 30, 2014**

TO: State Survey Agency Directors

FROM: Director
Survey and Certification Group

SUBJECT: Infection Control Breaches Which Warrant Referral to Public Health Authorities

Memorandum Summary

- ***Infection Control Breaches Warranting Referral to Public Health Authorities:*** If State Survey Agencies (SAs) or Accrediting Organizations (AOs) identify any of the breaches of generally accepted infection control standards listed in this memorandum, they should refer them to appropriate State authorities for public health assessment and management.
- ***Identification of Public Health Contact:*** SAs should consult with their State's Healthcare Associated Infections (HAI) Prevention Coordinator or State Epidemiologist on the preferred referral process. Since AOs operate in multiple States, they do not have to confer with State public health officials to set up referral processes, but are expected to refer identified breaches to the appropriate State public health contact identified at: http://www.cdc.gov/HAI/state-based/index.html

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Surveyors must report to State

Breaches to Be Referred

When one or more of the following infection control breaches is identified during any survey of a Medicare- and/or Medicaid-certified provider/supplier, the SA or AO should make the appropriate State public health authority aware of the deficient practice:

- Using the same needle for more than one individual;
- Using the same (pre-filled/manufactured/insulin or any other) syringe, pen or injection device for more than one individual;
- Re-using a needle or syringe which has already been used to administer medication to an individual to subsequently enter a medication container (e.g., vial, bag), and then using contents from that medication container for another individual;
- Using the same lancing/fingerstick device for more than one individual, even if the lancet is changed.

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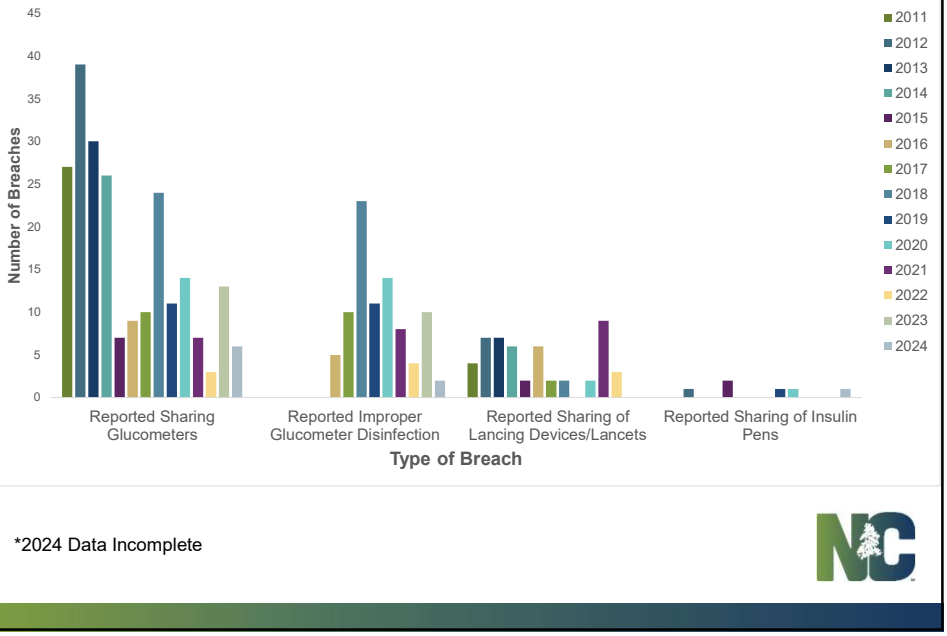

*2024 Data Incomplete

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North Carolina Hepatitis Outbreaks, Non-Hospital Settings

Setting	Year	Type	No. Incident Infections
Cardiology	2008	HCV	5
ALF	2010	HBV	8
SNF	2010	HBV	6
SNF	2010	HBV	6
Dialysis	2013	HBV	1
Total			**26**

- Also, a more recent SNF HBV outbreak

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Multidrug-Resistant Organisms (MDROs)

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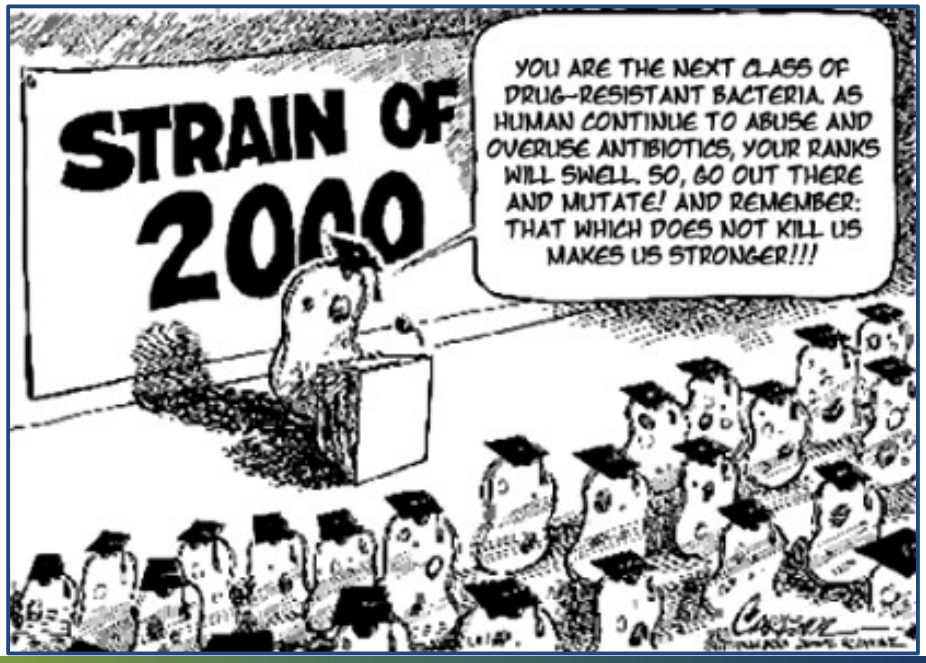

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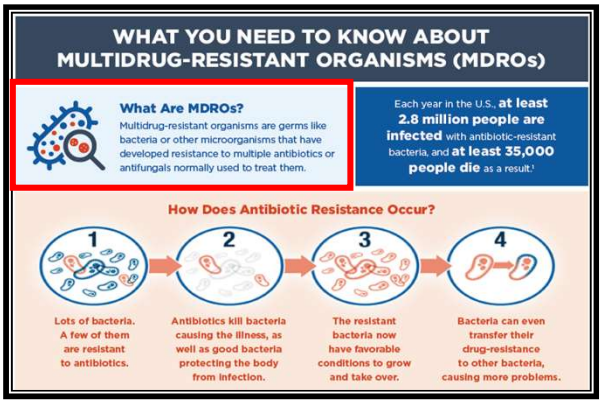
Multidrug-resistant Organisms (MDROs)



https://epi.dph.ncdhhs.gov/cd/diseases/hai.html

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Significance of MDROs

- Affects vulnerable patient populations
- Are easily transmitted in and between healthcare / congregate care settings
- Difficult to treat
  - Require more toxic antimicrobials to treat
- Improper treatment
  - Some organisms may produce another enzyme that makes it easier to transmit resistance
- Cause increase in:
  - Mortality
  - Healthcare costs
  - Length of stays
- Estimates of economic costs vary, up to 20 BILLION dollars in direct healthcare costs

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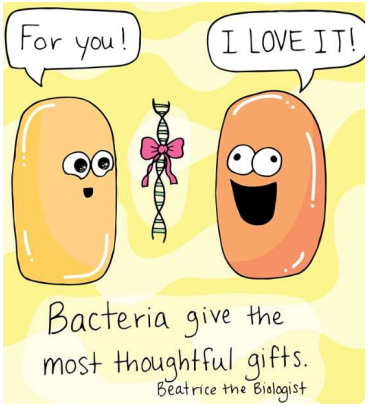
Significance of Carbapenemase-producing Organisms (CPO)

TBO

- Carbapenemase-producing organisms
  - Mobile genetic elements, such as plasmids
  - Highly resistant
- **Urgent public health threat**
- Over 9,000 healthcare-associated infections each year
- Up to 50% mortality



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Slide 40

TB0 Update slide content for CPO specific info
Breeyear, Taylor L, 2024-09-17T19:16:36.630

Candida auris

Highly drug-resistant

Patients can become colonized and develop invasive infections

Spreads in healthcare settings

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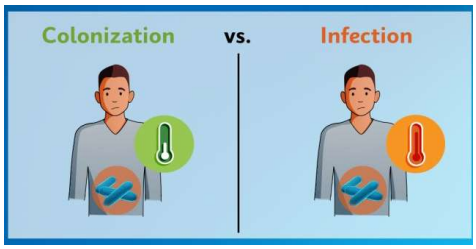
MDRO Colonization

- Colonization means that a person is carrying a MDRO but does not have symptoms of an infection.
- Colonized people play a large role in the spread of MDROs to other people in healthcare settings (require infection control action).



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Targeted MDRO Specific Infection Prevention Measures

TBO

- Laboratory Notification
- Private room
  - Indefinite contact precautions for colonized and infected patients.
  - Enhanced barrier precautions in long-term care
    - For *C.auris,* with approval by DPH.
  - If necessary, cohort infected residents.
- Adherence to hand hygiene and transmission-based precautions.
- Clean with List P disinfectant for *C. auris*.
- Conduct screening.
- Educate staff about organism and reasons for precautions.
  - Including non-clinical staff like EVS
- Review infection prevention policies and procedures.
- Communicate diagnosis with other facilities on transfer or discharge.
- Antimicrobial Stewardship

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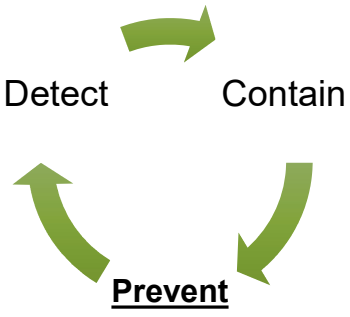
TBO

DPH Response to MDROs

- Detect
  - C. auris and CPO: 1 case=outbreak
  - Nationally notifiable
  - Antimicrobial Resistance Laboratory Network (ARLN)
- Contain
  - Ensure rapid response & containment
    - Prevent transmission through:
      - Point-prevalence survey (PPS)
      - Infection control assessment and response (ICAR)
- Prevent
  - Stewardship efforts
    - Antimicrobial resistance workgroup
    - Get Smart Campaign
    - STAR Partners
  - Education
    - Collaborative effort (DPH, LHD, RIPS, SPICE)



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Slide 43

TB0 See comment on Major Findings slide
Breeyear, Taylor L, 2024-09-17T19:35:24.716

Slide 44

TB0 See comment on Major Findings slide. Talk more about screening collaboration with DPH
Breeyear, Taylor L, 2024-09-17T19:35:51.669

Communication between Healthcare Facilities

- Useful
  - Patient status/needs
  - Care plan
- Beneficial
  - Protects patients/residents
  - Controls healthcare costs
  - Prevents spread of MDROs
- Required by CMS
  - Reform of Requirements for Long-Term Care Facilities
  - Revisions to Requirements for Discharge Planning for Hospitals, Critical Access Hospitals, and Home Health Agencies

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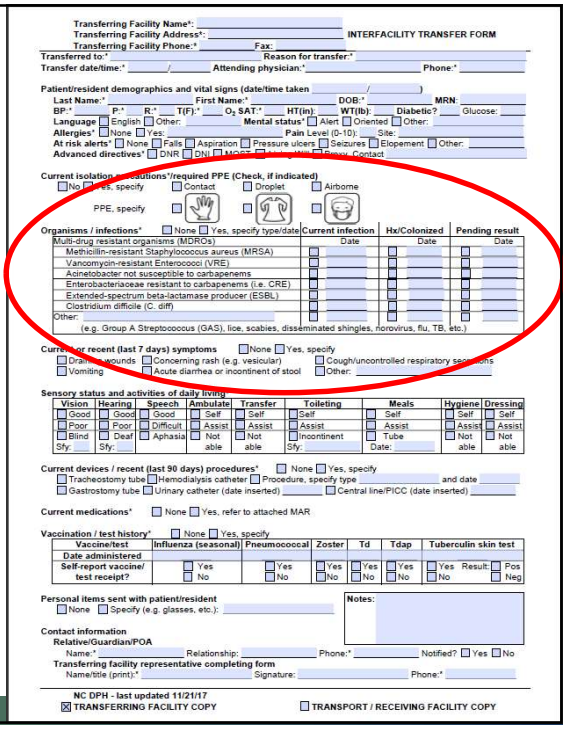
Sections

- Facility Information
- Demographics
- Current status
- Medications
- Vaccination/test hx.
- Personal items
- Contact information



Transferring Facility Name*:
Transferring Facility Address*:
Transferring Facility Phone:* Fax:

INTERFACILITY TRANSFER FORM

Transferred to:* Reason for transfer:*
Transfer date/time:* Attending physician:* Phone:*

Patient/resident demographics and vital signs (date/time taken)
Last Name:* First Name:* DOB:* MRN:
BP:* P:* R:* T(F):* O_2 SAT:* HT(in): WT(lb): Diabetic? Glucose:
Language English Other: Mental status* Alert Oriented Other:
Allergies* None Yes: Pain Level (0-10): Site:
At risk alerts* None Falls Aspiration Pressure ulcers Seizures Elopement Other:
Advanced directives* DNR DNI MOST Healthcare surrogate Primary Contact

Current isolation precautions*/required PPE (Check, if indicated)
No Yes, specify Contact Droplet Airborne
PPE, specify

Organisms / infections* None Yes, specify type/date	Current infection	Hx/Colonized	Pending result
Multi-drug resistant organisms (MDROs)	Date	Date	Date
Methicillin-resistant Staphylococcus aureus (MRSA)			
Vancomycin-resistant Enterococci (VRE)			
Acinetobacter not susceptible to carbapenems			
Enterobacteriaceae resistant to carbapenems (i.e. CRE)			
Extended-spectrum beta-lactamase producer (ESBL)			
Clostridium difficile (C. diff)			
Other:			

(e.g. Group A Streptococcus (GAS), lice, scabies, disseminated shingles, norovirus, flu, TB, etc.)

Current or recent (last 7 days) symptoms None Yes, specify
Draining wounds Concerning rash (e.g. vesicular) Cough/uncontrolled respiratory secretions
Vomiting Acute diarrhea or incontinent of stool Other:

Sensory status and activities of daily living

Vision	Hearing	Speech	Ambulate	Transfer	Toileting	Meals	Hygiene	Dressing
Good	Good	Good	Self	Self	Self	Self	Self	Self
Poor	Poor	Difficult	Assist	Assist	Assist	Assist	Assist	Assist
Blind	Deaf	Aphasia	Not able	Not able	Incontinent	Tube	Not able	Not able
Sfy:	Sfy:				Sfy:	Date:		

Current devices / recent (last 90 days) procedures* None Yes, specify
Tracheostomy tube Hemodialysis catheter Procedure, specify type and date
Gastrostomy tube Urinary catheter (date inserted) Central line/PICC (date inserted)

Current medications* None Yes, refer to attached MAR

Vaccination / test history* None Yes, specify

Vaccine/test	Influenza (seasonal)	Pneumococcal	Zoster	Td	Tdap	Tuberculin skin test
Date administered						
Self-report vaccine/ test receipt?	Yes No	Yes No	Yes No	Yes No	Yes No	Yes Result: Pos No Neg

Personal items sent with patient/resident
None Specify (e.g. glasses, etc.):

Notes:

Contact information
Relative/Guardian/POA
Name:* Relationship: Phone:* Notified? Yes No
Transferring facility representative completing form
Name/title (print):* Signature: Phone:*

NC DPH - last updated 11/21/17
☒ TRANSFERRING FACILITY COPY ☐ TRANSPORT / RECEIVING FACILITY COPY

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NC DPH Interfacility Transfer Form

Benefits

- Standardized format for interfacility communication of patient MDRO status during transfer
- Information needed/desired during transfer all in one place
- Complies with CMS requirements for interfacility communication
- http://epi.publichealth.nc.gov/cd/hai/docs/InterfacilityTransferInstructionsandForm.pdf

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Early detection and aggressive implementation of control measures are key to prevention and control

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Outbreaks

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DPH Hepatitis B Investigation

- Notification to DPH by local health department – New HBV case in LTCF resident
  - Patient admitted to hospital for a fall but also had new onset jaundice
  - Patient residing in facility for over a year, no other healthcare encounters identified
- Infection Prevention Site Visit
  - Recommendation to obtain individual glucometers for each resident – facility elected not to pursue initially
  - Also recommended increasing HH dispensers and relocate to more assessable locations

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DPH Hepatitis B Investigation

- Screening of all individuals that still resided in facility receiving glucose monitoring during 21-week period prior to onset of index case
  - 23 total tested, one chronic and two probable acute cases
- Individual glucometers obtained
- Further testing showed total of index acute patient, one chronic case, one false + acute and a cleared case
- Investigation/Establishment of epi links
  - Glucometer checks
  - Room placement and shared spaces
  - In-house services (podiatry, dental services, salon, wound care, injections, phlebotomy)
  - Outside services (common providers or admissions)

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DPH Hepatitis B Investigation

- Second Infection Prevention Site Visit
  - Observed new facility protocols for individual glucometers
  - Facility had increase HH dispensers
  - Nail clippers were obtained for individual residents
- Genotyping results
  - Evidence that the cases were related

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Group A Streptococcus

LTC residents at higher risk of invasive disease

- Older age and comorbidities, breaks in skin, indwelling devices
- **Wound care**
  - Careful attention to IP practices essential to prevent transmission

Response to LTC invasive GAS (iGAS) case

- LHD and public health will provide guidance on response steps
  - Identify additional symptomatic cases
  - Identify potential asymptomatic carriers
  - Assess and re-emphasize infection prevention practices

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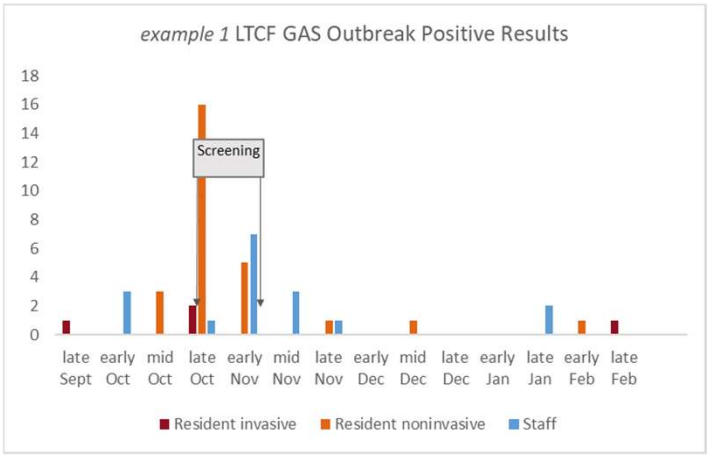
Group A Streptococcus



- Key response and control measures-
  - Screened by culture residents (throats and wounds) and epi-linked staff
  - Site visits
  - Emphasized education on IP and wound care practices
  - Invasive cases and several non-invasives had wound care as a risk factor

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Group A Streptococcus

***example 2* LTCF GAS Outbreak**

Spring- 1st invasive resident case

Summer- 2nd invasive resident case = **Outbreak**

- Screening identified significant number of residents with throat colonization

Fall- two more invasive cases

Winter- 5th invasive case

- Sequencing confirmed relatedness despite length of time between cases
- Invasive cases had **wound care as shared risk factor**

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Partnerships

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Why Involve Public Health?

- Investigations require communicable disease / infection prevention expertise and experience
- Uniquely qualified to assess patient risk
- Complex problem
- Threats to public's health

Public Health
Prevent. Promote. Protect.

NC

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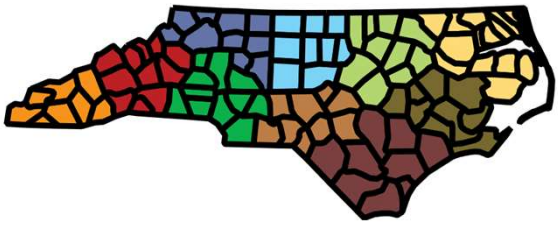
Regional Infection Prevention Support Team

Infection prevention saves lives

Infection prevention support, education, and training to protect the highly vulnerable residents of NC's long-term care facilities



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Regional Infection Prevention Support (RIPS) Teams

Our mission is to increase infection prevention knowledge to mitigate and prevent health threats like respiratory illnesses and all other infectious diseases in the long-term care setting.

The RIPS Program offers*:
- Infection prevention and control assistance that is supportive and consultative rather than regulatory
- Staff training/education around infection prevention measures using practical, hands-on techniques
- Site visits to assess facilities' infection control programs accompanied by written recommendations to improve policies and practices
- Assistance with outbreak management and response
- In-person infection prevention education

*All services by RIPS are provided at no cost.

Education Modules*:
- Chain of Infection
- Standard Precautions: Hand Hygiene
- Standard Precautions: PPE
- Transmission-based Precautions
- Standard Precautions: Environmental Cleaning
- Employee Health
- Storage of Supplies
- Wound Care

*Ask about our CEU options.

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RIPS is now a smaller-scale program with seven consultants covering all NC counties

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Resources

- NC Division of Public Health, SHARPPS Program
  - http://epi.publichealth.nc.gov/cd/diseases/hai.html
- Safe Injection Practices
  - CDC Preventing Unsafe Injection Practices: https://www.cdc.gov/injection-safety/hcp/infection-control/index.html
  - CDC Project Firstline: https://www.cdc.gov/project-firstline/index.html
- MDROs
  - CDC Strategies for Prevention and Response to MDROs
    https://www.cdc.gov/healthcare-associated-infections/php/preventing-mdros/index.html
  - NC DPH MDRO Toolkit for Long-Term Care Facilities
    https://epi.dph.ncdhhs.gov/cd/docs/MDROToolkit.pdf
- Antimicrobial Stewardship
  - http://epi.publichealth.nc.gov/cd/antibiotics/campaign.html
- Group A Strep in LTC (CDC resources)
  - https://www.cdc.gov/group-a-strep/php/ltcf-toolkit/increased-risk.html
  - https://www.cdc.gov/group-a-strep/php/ltcf-toolkit/transmission.html

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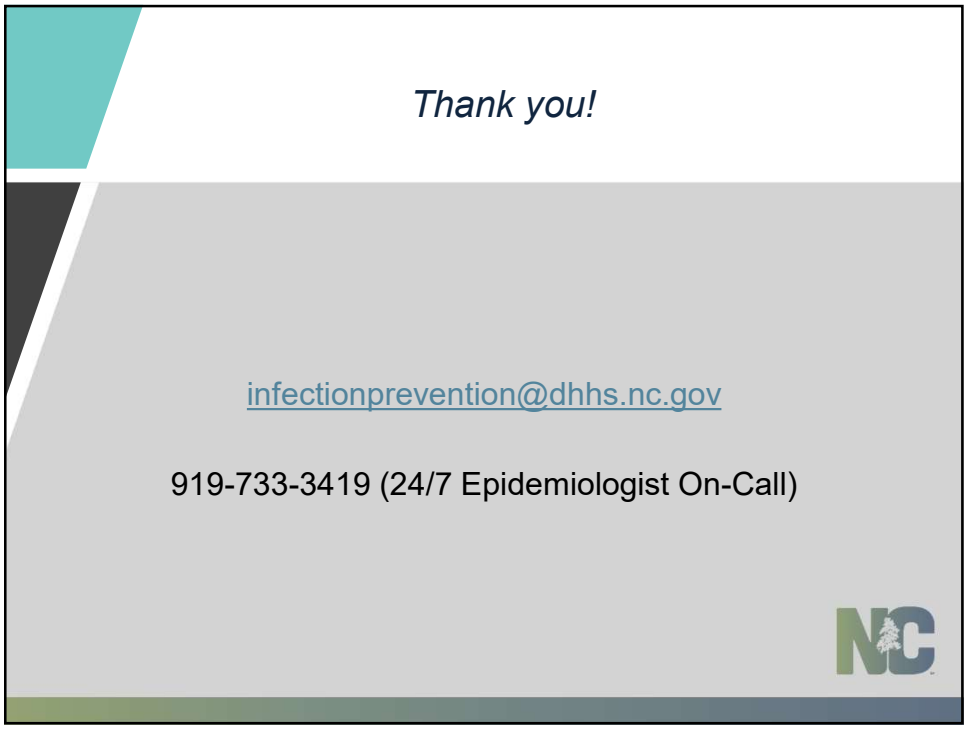
Thank you!
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